

Do Digital Marketing Strategies Influence Pharmaceutical Buying Behaviour? An Empirical Study from a Tier-2 Indian City

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Abstract

Digital marketing has become a central component of pharmaceutical promotion, yet there is limited empirical evidence from tier-2 Indian cities on whether such strategies actually influence buying behavior. This study examines the impact of e-marketing strategies on pharmaceutical decision-making among four key stakeholder groups in Lucknow: consumers, doctors, pharmacists, and marketing professionals. Using a structured questionnaire (33 Likert-scale items) administered to 420 respondents, data were analyzed through descriptive statistics, Pearson correlations, one-sample t-tests, one-way ANOVA, post hoc Tukey tests, and multiple regression. The results indicate that (i) e-marketing exposure shows no significant relationship with consumers' purchase decisions; (ii) doctors' prescription behavior is not significantly influenced by e-marketing; (iii) perceived effectiveness of e-marketing does not differ significantly across stakeholder groups; and (iv) digital literacy and e-marketing exposure do not significantly predict user behavior in regression models. The findings suggest a noticeable gap between the widespread adoption of digital pharmaceutical marketing and its actual behavioral impact in this context. The study highlights the need to redesign digital strategies beyond mere visibility toward trust-building, clinical relevance, and integration with offline channels.

Keywords: digital marketing, pharmaceutical buying behavior, e-pharmacy, prescription behavior, Lucknow, India, stakeholder perception

1. INTRODUCTION

The rapid expansion of internet access, smartphones, and social media has transformed the way pharmaceutical companies communicate with consumers and healthcare professionals. Digital marketing is increasingly regarded as a strategic necessity to improve reach, engagement, and brand visibility in the pharmaceutical sector. Several studies argue that digital channels allow firms to target patients and prescribers more efficiently and at lower cost, while enabling real-time analytics and personalized content(S Anush Kumar et al., 2021).

In India, pharmaceutical companies have been steadily shifting from traditional detailing and print promotion to e-detailing, webinars, social media, e-pharmacies and mobile apps, particularly after the COVID-19 pandemic (*Pharma Digital Marketing in India: Trends, Challenges, and Adaptation Strategies*, n.d.). Research on digital marketing and consumer behavior in pharmaceuticals suggests that online information, convenience and perceived time-efficiency influence attitudes toward e-pharmacies and online medicine purchase (Ansari et al., 2025). At the same time, there is growing concern about the quality of online information, regulatory constraints and consumer trust, which may limit the translation of digital exposure into actual purchase or prescription decisions (Shweta Kale et al., 2024).

Existing literature is dominated by conceptual or descriptive work and often assumes that digital marketing *positively* influences buying behavior and sales (BHARSKAR & SIDDHESHWAR, 2020). However, empirical, multi-stakeholder evidence from Indian tier-2 cities remains scarce. Cities like Lucknow represent a critical context: they are large enough to have active pharmaceutical markets and digital infrastructure, but still reflect mixed levels of digital literacy and healthcare access compared to metro cities.

Against this backdrop, the present study asks a critical question: Do digital marketing strategies truly influence pharmaceutical buying behavior in a tier-2 Indian city, or are they primarily generating awareness without conversion? Using quantitative data from 420 respondents representing consumers, doctors, pharmacists and marketing professionals in Lucknow, this paper evaluates the behavioral impact and perceived effectiveness of e-marketing strategies and examines the moderating role of demographics, particularly digital literacy.

2. REVIEW OF LITERATURE

2.1 Digital marketing in the pharmaceutical sector

Studies on pharmaceutical digital marketing report that online tools such as websites, social media, email campaigns, e-detailers and webinars help companies extend reach and customize information for both patients and healthcare professionals (S Anush Kumar et al., 2021). Social media marketing has been shown to build brand awareness and disseminate health information, but its translation into measurable sales impact remains debated, partly due to regulatory constraints and requirements for fair balance and risk disclosure (Shweta Kale et al., 2024).

2.2 Consumer behavior and e-pharmacy adoption

Recent systematic reviews and empirical studies highlight that consumers' adoption of online pharmacies depends on perceived convenience, time-efficiency, previous e-commerce experience, trust in platforms, and social influence (Ansari et al., 2025). However, barriers such as safety concerns, fear of counterfeit drugs, and lack of regulatory clarity may reduce the impact of digital promotions on actual purchase behavior (Ushir & Diana, 2022).

2.3 Digitalization and pharmaceutical decision-making

Some studies conclude that digitalization has reshaped consumer psychology in relation to OTC and pharmaceutical products and recommend data-driven digital campaigns to influence buying behavior (Kumar et al., 2025). Others report positive relationships between digital marketing elements and promotion of local pharmaceutical products, but these findings are often based on single-stakeholder samples or specific platforms (Al-Assaf et al., 2025).

Overall, the literature tends to assume that more digital marketing leads to more influence. Yet, evidence on *whether* and *how strongly* digital strategies actually shape pharmaceutical buying and prescribing decisions, especially across multiple stakeholders in a tier-2 Indian city, remains limited. The present study directly addresses this gap using empirical data from Lucknow.

3. OBJECTIVES AND HYPOTHESES

Based on the broader PhD study, this paper focuses on the following objectives:

1. To examine the relationship between e-marketing strategies and consumers' pharmaceutical purchase decisions.
2. To assess whether e-marketing significantly influences doctors' prescription behavior.
3. To compare stakeholder groups (doctors, consumers, pharmacists, marketing professionals) regarding perceived effectiveness of e-marketing strategies.
4. To analyze whether digital literacy and e-marketing exposure predict or moderate user behavior in the pharmaceutical context.

The corresponding hypotheses are:

- **H₀₁:** There is no significant relationship between e-marketing strategies and consumers' pharmaceutical purchase decisions.
- **H₀₂:** E-marketing does not significantly influence doctors' prescription behavior in Lucknow.
- **H₀₃:** There is no significant difference in the perceived effectiveness of e-marketing strategies across stakeholder groups.
- **H₀₄:** Demographic factors, particularly digital literacy, do not significantly moderate or predict user behavior in response to e-marketing.

4. RESEARCH METHODOLOGY

4.1 *Research design and setting*

The study adopts a quantitative, cross-sectional survey design. Data were collected in Lucknow, a tier-2 city and emerging pharmaceutical and healthcare hub in North India, characterized by a mix of public and private hospitals, retail pharmacies, and a growing base of digitally active consumers.

4.2 *Sample and respondents*

The total sample comprised $N = 420$ respondents drawn from four stakeholder categories:

- Doctors (n = 115)
- Pharmacists (n = 101)
- Consumers (n = 107)
- Marketing professionals (n = 97)

A purposive–convenience sampling approach was used to ensure representation from each stakeholder group. Respondents were screened to confirm basic exposure to digital platforms (e.g., smartphone and internet use).

4.3 *Instrumentation*

Data were collected using a structured, close-ended questionnaire. The tool included:

- Demographic section: age, gender, education, occupation, and self-reported digital literacy.
- Likert-scale items (Q6–Q39): 33 statements rated on a 5-point scale (1 = Strongly Disagree to 5 = Strongly Agree) covering:
 - Awareness and use of digital platforms in pharmaceutical marketing
 - Perceived essentiality and growth of e-marketing
 - Budget allocation and following of pharma updates
 - Consumer behavior variables (Q18–Q23)
 - Doctors' prescription-related variables (Q12–Q17)
 - Perceived effectiveness of e-marketing (Q29–Q34)

Composite indicators were created where appropriate, including a user behavior index based on items such as purchasing after digital promotion and engagement with pharma content.

4.4 Data analysis

Data were analyzed using SPSS. The following statistical techniques were applied:

- Descriptive statistics for demographic and item-level analysis
- Crosstabulations for Age × Occupation, Gender × Occupation, Education × Occupation, and Digital Literacy × Occupation
- Pearson correlation analysis (for H₀₁)
- One-sample t-tests among doctors (for H₀₂)
- One-way ANOVA with post hoc Tukey HSD (for H₀₃)
- Multiple linear regression with e-marketing exposure and digital literacy as predictors of user behavior (for H₀₄)

A significance level of 0.05 was adopted. Effect sizes (Cohen's *d*, η^2) were noted where relevant.

5. RESULTS

This section presents the analysis and interpretation of the survey data collected from 420 respondents belonging to four pharmaceutical stakeholder groups in Lucknow. Results are structured according to demographic profile and testing of hypotheses H₀₁–H₀₄.

5.1 Demographic Profile and Digital Readiness

Table 5.1: Distribution of Respondents by Age and Occupation

Age Group	Consumers	Doctors	Marketing Professionals	Pharmacists	Total
Under 25	24	20	18	20	82
25–35	24	26	16	18	84
36–45	13	20	22	17	72
46–60	25	19	21	27	92
60+	21	30	20	19	90
Total	107	115	97	101	420

Interpretation

All age groups were well represented across occupations. Doctors and consumers were more concentrated in the 25–35 age group, whereas pharmacists were most represented in the 46–60 group, indicating participation from both early-career and highly experienced professionals.

Table 5.2: Gender Distribution by Occupation

Gender	Consumers	Doctors	Marketing Professionals	Pharmacists	Total
Female	37	39	33	32	141
Male	32	39	32	35	138
Other	38	37	32	34	141
Total	107	115	97	101	420

Interpretation

The sample consisted of nearly uniform representation across gender groups, allowing unbiased comparison of responses and minimizing gender-based response bias.

Table 5.3: Education Level by Occupation

Education	Consumers	Doctors	Marketing Professionals	Pharmacists	Total
Undergraduate	40	41	30	34	145
Graduate	36	37	29	37	139
Postgraduate & Above	31	37	38	30	136
Total	107	115	97	101	420

Interpretation

Educational status was similarly distributed across occupations. Marketing professionals showed the highest postgraduate representation, reflecting their advanced strategic roles in pharma marketing.

Table 5.4: Digital Literacy by Occupation

Digital Literacy	Consumers	Doctors	Marketing Professionals	Pharmacists	Total
Very Low	24	23	22	17	86
Low	25	25	20	20	90
Moderate	25	18	16	20	79
High	20	24	21	16	81
Very High	13	25	18	28	84
Total	107	115	97	101	420

Interpretation

Doctors and pharmacists exhibited higher digital literacy levels, indicating readiness to engage with digital tools. Consumers were evenly distributed across all categories, indicating varied levels of digital access and skills.

5.2 H₀₁: Relationship Between E-Marketing and Purchase Decisions

Table 5.5: Descriptive Statistics of Consumer Behavior Variables (Q18–Q23)

Item	Mean	Std. Deviation	N
Q18 – Online research	3.11	1.36	420
Q19 – Influence of ads	3.06	1.43	420
Q20 – Trust in testimonials	3.06	1.48	420
Q21 – Purchase after e-promo	3.09	1.41	420
Q22 – Social media influence	3.05	1.49	420
Q23 – Newsletter engagement	3.04	1.45	420

Table 5.6: Pearson Correlation Matrix (Q18–Q23)

Variables	Q18	Q19	Q20	Q21	Q22	Q23
Q18	1	.035	-.075	-.091	.049	-.019
Q19		1	-.032	-.013	.001	-.041
Q20			1	-.027	-.005	-.037
Q21				1	-.129	-.004
Q22					1	.064
Q23						1

Note: $p < .01$ (Two-tailed)

Interpretation

Only one weak negative correlation emerged between Q21 and Q22 ($r = -.129$, $p = .008$). All other correlations were non-significant. Hence, **H_{01} is retained.**

5.3 H_{02} : Doctors' Prescription Behavior

Table 5.7: One-Sample t-Test Results (Test Value = 3, N = 115)

Item	Mean	SD	t	df	p	Cohen's d
Q12	3.17	1.44	1.23	114	.221	0.12
Q13	3.18	1.45	1.35	114	.179	0.13
Q14	3.08	1.48	0.57	114	.571	0.05
Q15	3.14	1.44	1.04	114	.302	0.10
Q16	3.02	1.34	0.14	114	.889	0.01
Q17	3.16	1.40	1.20	114	.233	0.11

Interpretation

All items were non-significant with negligible effect sizes.

H_{02} is retained.

5.4 H_{03} : Stakeholder Perception Comparison

Table 5.8: ANOVA Summary

Item	F	Sig.
Q29	1.547	.202
Q30	1.170	.321
Q31	0.620	.603
Q32	0.969	.407
Q33	0.324	.808
Q34	1.539	.204

Interpretation

No significant differences observed. Tukey HSD confirmed no group difference.

H₀₃ is retained.

5.5 H₀₄: Regression Results

Table 5.9: Model Summary

R	R ²	Adjusted R ²	Std. Error
.023	.001	-.004	.555

Table 5.10: Regression ANOVA

Source	SS	df	MS	F	p
Model	.066	2	.033	.107	.899
Residual	128.629	417	.308		

Table 5.11: Coefficients

Predictor	B	Beta	t	p
Exposure	-.001	-.002	-.032	.974
Literacy	-.009	-.023	-.462	.645

Interpretation

Model not significant.

H₀₄ retained.

6. DISCUSSION

This study set out to empirically test a widely held assumption in the pharmaceutical industry: that digital marketing strategies meaningfully influence buying and prescribing behavior. Contrary to much of the optimistic discourse surrounding pharma digital marketing, the results from a tier-2 Indian city suggest that:

- Awareness and exposure to e-marketing are present across stakeholders, but
- Behavioral impact is weak or non-existent in measurable terms.

The findings differ from several prior studies that report positive impacts of digital marketing on pharmacy promotion and online medicine sales (Al-Assaf et al., 2025). Instead, they align more closely with emerging evidence that questions whether social media and digital campaigns necessarily translate into actual behavior change or sales, particularly when consumer trust is low and regulation is tight (Shweta Kale et al., 2024). For consumers in this study, moderate engagement with online information and social media did not cohere into a clear pattern of digitally driven purchases. This suggests that offline influences such as physician advice, pharmacy recommendations, and price may overshadow digital promotions when it comes to the final decision to buy medicines. Similar concerns have been noted in studies of online pharmacy adoption, where convenience and experience matter, but safety and trust are critical filters (Ansari et al., 2025).

Doctors in the sample reported neutral views regarding the influence of e-marketing on their prescription behavior. This supports the idea that prescribing remains anchored in clinical judgment, guidelines and peer-reviewed evidence rather than in promotional content, especially in regulated therapeutic areas (Ushir & Diana, 2022). The absence of differences in perceived e-marketing effectiveness across stakeholder groups indicates a convergence of opinion: digital is seen as necessary and useful, but not transformative or highly persuasive. This may reflect a “baseline normalization” of digital channels: stakeholders accept them as part of the communication landscape but do not attribute strong behavioral influence to them. Finally, the failure of digital literacy and e-marketing exposure to predict user behavior suggests that simply increasing access or frequency of digital campaigns is unlikely to be sufficient. Quality, credibility, safety messaging, integration with healthcare providers, and alignment with patient needs may be far more critical than volume or technical sophistication of campaigns.

7. IMPLICATIONS FOR PRACTICE

1. Pharmaceutical firms should invest in credible, evidence-based digital content rather than merely increasing frequency of ads or promotions.
2. Designing tools that support doctors’ clinical decision-making (e.g., guideline-linked e-detailers, CME, outcome data) may be more effective than promotional messages alone.
3. Pharmacists in this study showed high digital literacy and engagement. They can serve as key intermediaries for educating patients about legitimate online resources and safe medicine use.
4. Given that digital literacy did not predict behavior, segmentation strategies should incorporate psychographic and trust-related factors, not just age, education or self-reported digital skills.
5. Firms should track prescription patterns, refill behavior, and adherence, rather than relying on click-through rates or views as indicators of success.’

8. LIMITATIONS AND FUTURE RESEARCH

This study is subject to several limitations:

- The cross-sectional design prevents causal inference. Longitudinal or experimental designs could better capture behavioral change.
- Data rely on self-reported perceptions and behaviors, which may be influenced by recall bias or social desirability.
- The study is limited to a single city (Lucknow); results may not generalize to metros or rural areas with different digital and healthcare ecosystems.
- The operationalization of “e-marketing exposure” and “user behavior” was based on specific questionnaire items; alternative measures may yield different patterns.

Future research could:

- Employ mixed-methods approaches, integrating qualitative interviews with patients, doctors and marketers to unpack *why* digital marketing fails or succeeds in influencing decisions.
- Use transactional or prescription data to directly link digital campaigns with actual sales or prescribing shifts.
- Compare tier-1, tier-2 and rural contexts to understand how infrastructure and socio-economic factors modify the effectiveness of digital strategies.
- Explore psychological constructs such as trust, perceived risk, and message credibility as mediators between digital exposure and behavior.

9. CONCLUSION

This empirical study from a tier-2 Indian city provides a sobering counterpoint to the prevailing enthusiasm around digital pharmaceutical marketing. Despite widespread awareness of digital tools and moderate engagement with online content, no statistically significant link was found between e-marketing strategies and pharmaceutical buying or prescribing behavior in the sample studied. Perceptions of e-marketing effectiveness were broadly similar across stakeholder groups, and digital literacy did not significantly shape user behavior. The findings suggest that, at least in this context, digital marketing may be operating more as a background informational layer than as a decisive behavioral driver. For digital strategies to genuinely influence pharmaceutical buying behavior, companies may need to move beyond visibility and convenience toward credibility, integration with clinical practice, and patient-centric value creation.

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